CLAIMS

What is claimed is:

1. A device for fluid cooled channeled heat exchange comprising:
   a. a flat plate heat exchanger, wherein the flat plate heat exchanger comprises a top plate and a base plate coupled together; and
   b. a plurality of fins coupled to the top plate;

   wherein the base plate comprises:
      i. fluid inlet configured to receive flow of a fluid in a heated state therethrough;
      ii. a plurality of channels coupled to the fluid inlet and configured to receive and to cool the fluid; and
      iii. a fluid outlet coupled to the plurality of channels and configured to receive the cooled fluid and to allow the cooled fluid to exit the device.

2. The device of claim 1, wherein the device further comprises a second plurality of fins coupled to the base plate.

3. The device of claim 1, wherein the device further comprises a first plurality of separate sealed gaps coupled in between the plurality of channels, wherein the separate sealed gaps are not traversed by the fluid.

4. The device of claim 3, wherein the first plurality of separate sealed gaps are filled with a gas.

5. The device of claim 3, wherein the device further comprises a second plurality of separate sealed gaps coupled in between the fluid inlet and the plurality of channels, wherein the separate sealed gaps are not traversed by the fluid.

6. The device of claim 5, wherein the second plurality of separate sealed gaps are filled with a gas.

7. The device of claim 3, wherein the device further comprises a third plurality of separate sealed gaps coupled in between the fluid outlet and the plurality of channels, wherein the separate sealed gaps are not traversed by the fluid.

8. The device of claim 7, wherein the third plurality of separate sealed gaps are filled with a gas.

9. The device of claim 1, wherein the device is coupled to heat source.

10. The device of claim 9, wherein the heat source is a microprocessor.

11. The device of claim 1, wherein the device is coupled to a pump.

12. The device of claim 1, wherein the plurality of channels comprise condensers configured to condense the fluid.

13. The device of claim 1, wherein the plurality of channels further comprise pins, wherein the pins protrude from and are perpendicular to the surface of the base plate.

14. The device of claim 1, wherein the fluid inlet, the plurality of channels, and the fluid outlet are in a radial configuration.

15. The device of claim 1, wherein the fluid inlet, the plurality of channels, and the fluid outlet are in a spiral configuration.

16. The device of claim 1, wherein the fluid inlet, the plurality of channels, and the fluid outlet are in an angular configuration.

17. The device of claim 1, wherein the fluid inlet, the plurality of channels, and the fluid outlet are in a parallel configuration.

18. The device of claim 1, wherein the fluid inlet, the plurality of channels, and the fluid outlet are in a serpentine configuration.

19. The device of claim 1, wherein the device is in a monolithic configuration.

20. The device of claim 1, wherein the device further comprises a conductive fluid proof barrier, wherein the barrier is interposed between the base plate and the top plate.

21. The device of claim 1, wherein the first plurality of fins are coupled with the top plate and the second plurality of fins are coupled with the base plate by a eutectic bonding method.

22. The device of claim 1, wherein the first plurality of fins are coupled with the top plate and the second plurality of fins are coupled with the base plate by an

adhesive bonding method.

23. The device of claim 1, wherein the first plurality of fins are coupled with the top plate and the second plurality of fins are coupled with the base plate by a brazing method.

24. The device of claim 1, wherein the first plurality of fins are coupled with the top plate and the second plurality of fins are coupled with the base plate by a welding method.

25. The device of claim 1, wherein the first plurality of fins are coupled with the top plate and the second plurality of fins are coupled with the base plate by a soldering method.

26. The device of claim 1, wherein the first plurality of fins are coupled with the top plate and the second plurality of fins are coupled with the base plate by an epoxy.

27. The device of claim 1, wherein the flat plate heat exchanger comprises a material with a thermal conductivity value larger than 150 W/m-K.

28. The device of claim 1, wherein the flat plate heat exchanger comprises copper.

29. The device of claim 1, wherein the flat plate heat exchanger comprises aluminum.

30. The device of claim 1, wherein the fluid outlet and the plurality of channels comprise precision machined metals.

31. The device of claim 1, wherein the fluid outlet and the plurality of channels comprise precision machined alloys.

32. The device of claim 1, wherein the plurality of fins comprise aluminum.

33. The device of claim 1, wherein the fluid is selected from one of a liquid and a combination of a liquid and a vapor.

34. The device of claim 1, wherein the fluid is comprised from the group comprising of water, ethylene glycol, isopropyl alcohol, ethanol, methanol, and hydrogen peroxide.

35. A device for two phase fluid cooled channeled heat exchange comprising:

a. a flat plate heat exchanger, wherein the flat plate heat exchanger comprises a top plate and a base plate coupled together, and the base plate comprises:

i. a single phase region comprising a plurality of two phase channels configured to permit flow of a fluid therethrough, along a first axis;

ii. a condensation region comprising a plurality of condenser channels coupled to the plurality of two phase channels, and configured to permit flow of the fluid therethrough, along a second axis not parallel to the first axis; and

b. a first plurality of fins coupled to the top plate of the flat plate heat exchanger.

36. The device of claim 35, wherein the device further comprises a plurality of separate sealed gaps coupled in between the single phase region and the condensation region, wherein the separate sealed gaps are filled with a gas.

37. The device of claim 35, wherein the device further comprises a second single phase region comprising a plurality of single phase channels coupled to the plurality of condenser channels and configured to permit flow of a fluid therethrough, along the first axis.

38. The device of claim 35, wherein the plurality of two phase channels and the plurality of condenser channels are in a serpentine configuration.

39. The device of claim 35, wherein the device further comprises a second plurality of fins coupled to the base plate of the flat plate heat exchanger.

40. The device of claim 35, wherein the device is coupled to a heat source.

41. The device of claim 40, wherein the heat source is a microprocessor.

42. The device of claim 35, wherein the fluid is selected from one of a liquid and a combination of a liquid and a vapor.

43. The device of claim 35, wherein the fluid is comprised from the group comprising of water, ethylene glycol, isopropyl alcohol, ethanol, methanol, and hydrogen peroxide.

44. The device of claim 35, wherein the fluid comprises water.

45. The device of claim 35, wherein the flat plate heat exchanger comprises copper.

46. The device of claim 35, wherein the plurality of fins comprise aluminum.

47. A device for fluid cooled channeled heat exchange comprising:

a. means for supplying fluid;

b. means for flat plate heat exchange having a channel fluid carrying means and configured to receive the fluid from the means for supplying fluid, and;

c. means for heat dissipation coupled to the means for flat plate heat exchange; and

d. means for airflow generation coupled to the means for heat dissipation.

48. A system for heat exchange comprising:

a. one or more fluid channel heat exchangers each comprising at least two separate fluid paths configured to permit flow of a fluid therethrough; and

b. one or more pumps configured to circulate the fluid to and from the one or more fluid channel heat exchangers.

49. The system for heat exchange of claim 48, wherein the system further comprises a plurality of heat sources.

50. The system for heat exchange of claim 49, wherein the plurality of heat sources comprise one or more microprocessors.

51. The system for heat exchange of claim 49, wherein the plurality of heat sources comprise the one or more pumps.

52. The system for heat exchange of claim 48, wherein the one or more fluid channel

heat exchangers are further configured to cool a fluid in a heated state to a cooled state.

53. The system for heat exchange of claim 52, wherein the at least two fluid paths are configured to carry the fluid in the heated state from the plurality of heat sources and to carry the fluid in the cooled state to the plurality of heat sources.

54. The system of claim 48, wherein the at least two separate fluid paths are parallel.

55. The system of claim 48, wherein the at least two separate fluid paths are in a serpentine configuration.

56. The system of claim 48, wherein the fluid is selected from one of a liquid and a combination of a liquid and a vapor.

57. A method for manufacturing a flat plate heat exchanger comprising:
   a. machining fluid channels into each of two plate halves;
   b. soldering fins onto each of the two plate halves;
   c. nickle plating the fluid channels; and
   d. coupling the two halves such that the fluid channels of each of the two plate halves mate and form a leakproof fluid path.

58. The method of claim 57, wherein the two halves are coupled by a soldering method.

59. The method of claim 58, wherein the soldering method comprises utilizing a solder paste applied by stencil screen printing onto each of the two plate halves to

form a bonding interface resulting in a hermetic seal.

60. The method of claim 58, wherein the soldering method comprises a step soldering process for multiple soldering operations.

61. The method of claim 57, wherein the two halves are coupled by an epoxy.

62. A method for manufacturing a flat plate heat exchanger comprising:

a. manufacturing a first finned extrusion;

b. manufacturing a second finned extrusion;

c. machining complementary fluid channels onto the first and second finned extrusions;

d. coupling the first finned extrusion to the second fined extrusion such that the fluid channels of the first and second finned extrusions mate and form a leakproof fluid path.

63. The method of claim 62, wherein the first finned extrusion is coupled to the second finned extrusion by a soldering method.

64. The method of claim 63, wherein the soldering method comprises utilizing a solder paste applied by stencil screen printing onto each of the first and second finned extrusions to form a bonding interface resulting in a hermetic seal.

65. The method of claim 63, wherein the soldering method comprises a step soldering process for multiple soldering operations.

66. The method of claim 62, wherein the first finned extrusion is coupled to the

second finned extrusion by an epoxy.

67. A method for manufacturing a flat plate heat exchanger comprising:

a. manufacturing a first finned halve by a skiving method;

b. manufacturing a second finned halve by a skiving method;

c. machining complementary fluid channels onto the first and second finned halves;

d. coupling the first finned halve to the second fined halve such that the fluid channels of the first and second finned halves mate and form a leakproof fluid path.

68. The method of claim 67, wherein the two finned halves are coupled by a soldering method.

69. The method of claim 68, wherein the soldering method comprises utilizing a solder paste applied by stencil screen printing onto each of the first and second finned halves to form a bonding interface resulting in a hermetic seal.

70. The method of claim 68, wherein the soldering method comprises a step soldering process for multiple soldering operations.

71. The method of claim 67, wherein the two finned halves are coupled by an epoxy.